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EXAMINER	
RIZZUTO, KEVIN P	

ART UNIT	PAPER NUMBER
2183	

DATE MAILED: 07/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/868,797	WEISS, MATTHIAS	
	Examiner	Art Unit	
	Kevin P. Rizzuto	2183	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 July 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *11-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *11-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *5/9/05* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 11-20 have been examined.

2. Acknowledgement of papers filed: amendment filed on 5/9/2005.

Withdrawn Objections and Rejections

3. Applicant, via amendment, has overcome all objections and rejections set forth in the previous Office Action unless otherwise stated below. Consequently, said objections and rejections have been withdrawn by the examiner.

Drawings

4. The drawings are objected to because the handwritten text added to figure 2. The characters and reference numbers must be plain and legible. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top

margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

New Claim Objections

5. Claim 17 is objected to for the following informalities: Typographical error. Claim 17, line 4 as amended states, "step, *and and* wherein a plurality" (emphasis added by examiner). Appropriate correction is required.

Maintained 35 USC 112 Claim Rejections

6. Applicant has failed to overcome the 35 U.S.C. 112 rejections set forth in the previous Office Action for claims 17-19. Therefore, these rejections are respectfully maintained by the examiner and copied below for applicant's convenience.

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> **The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.**

8. Claim 17 recites the limitation "the number of word parts to be differentiated that occurs most frequently within the configuration". It is unclear to the examiner what the limitation implies about the most frequently occurring word parts. The independent claim from which this claim depends indicates that only the differences between a previous program word and the current program word are encoded. This does not mean that the most frequently occurring parts are represented. See similar for claims

18 and 19. To further clarify, the structuring and grammar of the claim language causes the claim to be unclear. For instance, applicant states "to be differentiated that occurs most frequently", however it is unclear what this means. It is unclear what "the number of instruction word parts to be differentiated" are differentiated from, how this occurs most frequently, and how this correlates to the disclosed invention. Examiner recommends a rephrasing of the claim to more clearly indicate the exact limitation that is intended to be claimed. Since the specification does not clarify the problem (including paragraphs 13 and 14 as cited by Applicant in the remarks of the amendment), claims 17-19 will not be further treated on their merits.

9. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

10. Claims 17-19 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The claim states that "the program word consists of a number of instruction word parts that corresponds to the number of instruction word parts to be differentiated that occurs most frequently in the configuration". It is unclear in the specification how the most frequently occurring word parts are involved in the compression method. Compressing the differences between a previous program word and the current program word does not imply encoding the most frequently occurring word parts. It is

unknown if the most frequently occurring word parts are used in the compression or if the compressed program words are then compressed a second time using the most frequently occurring word parts. Thus, claims 17-19 are not enabling to allow one of ordinary skill in the art to make or use the claimed invention without excessive and undue experimentation.

Maintained Claim Rejections

11. Applicant has failed to overcome the 35 U.S.C. 103 rejections set forth in the previous Office Action for claims 11-20. Therefore, these rejections are respectfully maintained by the examiner and copied below for applicant's convenience.

Maintained Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

13. Claims 11-16 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over the applicant's admitted prior art (Description of the Invention, Pages 2 and 3), and further in view of Smith et al., "Parallel algorithms for data compression".

14. As for claim 11, the applicant's admitted prior art discloses the invention substantially as claimed, but has not explicitly taught a group of previous program words for comparison to the current program word. The admitted prior art teaches the

configuration step has program words and a first group of preceding primary instructions, "the program words are assembled from sequential primary instruction words" (a first group, page 3, paragraph 8), an execution step wherein the compressed primary instructions (program words) are decompressed into sequential secondary instruction words of a full width to control the functional units (page 3, paragraph 8), obtaining a store of a secondary instruction (not a group) (page 3, paragraphs 8-10) and generating a secondary instruction from the previously created secondary instruction and the program words which indicate the differences (page 3, paragraphs 8-10). However, as already noted above, the admitted prior art does not teach a group of previous instructions for comparison to the current program word. This inherently also means that there are no characteristics taught and there is not a second *group* of secondary instructions, since the prior art is limited to only one secondary instruction and there is no need to index a specific one.

15. However, Smith et al. teaches a data compression scheme that utilizes a dictionary, or window, of previous data to compress the current data by using pointers (first characteristic) into the dictionary to replace the current data (Section 1). The entries in the dictionary also have characteristics (second characteristics), which indicate another specific entry in the dictionary; this is called an "expanded target" of that pointer. (Section 2) One of ordinary skill in the art of data compression would have recognized the advantage of having a larger window of previous data, which translates to a group of previous program words in this case, to increase the probability of encountering similar data. Having a larger window, or group, of data allows for the best

or longest match to be found, requiring less data in the compressed version. Since finding the best possible compression is the ultimate goal of data compression, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of the applicant's admitted prior art to include a group, or window, of previously seen program words to increase the probability of encountering a similar program word, thereby reducing the amount of information needed to store the compressed version of the program word.

16. As for claim 12, the applicant's admitted prior art, in view of Smith et al. (Section 5), discloses the invention substantially as claimed. Sliding windows of previous data were well known in the art at the time of the invention, thus one of ordinary skill in the art would have recognized the advantage of using a sliding window of previous program words would provide a simple table update scheme that requires less logic than more complicated update schemes. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of the applicant's admitted prior art to utilize a sliding window of previously encountered program words, thereby reducing the overhead of the table update logic.

17. As for claim 13, the applicant's admitted prior art, in view of Smith et al., discloses the invention substantially as claimed, but has not explicitly taught the replacement of the program word used to encode the current program word with the current program word.

18. However, the Most Recently Used (MRU) cache update scheme was well known in the art at the time of the invention, which is applicable to table updates in general,

and was known to be simpler than other update schemes. One of ordinary skill in the art would have recognized that replacing the most recently used program word contained in the group of previous program words would guarantee that the group is not filled with only program words of one category. This would reduce the redundancy in the table ensuring a better mean compression ratio. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of claim 11 to use an update scheme that replaces the previous program word with the current program word in order to reduce the redundancy in the table, thereby improving compression.

19. As for claim 15, see claim 11.

20. As for claim 16, see claim 11.

21. As for claim 20, the applicant's admitted prior art, in view of Smith et al., has taught the invention substantially as claimed, but has not explicitly taught an instruction buffer for storing generated instructions and having line-by-line access.

22. However, it is inherent in the method as stated in the arguments for claim 11 that the generated instructions be placed in some type of buffer since the generated instructions are used to generate future program words. This memory, by nature, would be line-by-line addressable (i.e. RAM, ROM).

23. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over the applicant's admitted prior art (Description of Invention), in view of Smith et al., "Parallel algorithms for data compression", and further in view of Bealkowski et al., U.S. Patent No. 5,636,352.

24. As for claim 14, the applicant's admitted prior art, in view of Smith et al., discloses the invention substantially as claimed, but has not explicitly taught the group of program words not being updated.

25. However, Bealkowski et al. has taught an instruction compression scheme that utilizes a synonym table that is not updated for compressing/decompressing program instructions (col. 4, lines 4-16). One of ordinary skill in the art of data compression would have recognized that utilizing a table of program words that does not require updating allows for hand-selected program words that are known to yield a higher compression ratio for a given program and eliminates the overhead of the update logic. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of that applicant's admitted prior art to utilize a program word table that is not updated to allow for hand-selecting of program words that are known to yield a higher compression ratio and to eliminate the overhead of the update logic.

Response to Arguments

26. Applicants arguments filed on 5/9/2005 have been fully considered but they are not persuasive.

27. Applicant argues that the limitations found in claims 17-19 are in fact enabled and definite.

> "The specification (e.g., paragraphs [0013]-[0014]) describes how program words are constructed early in the configuration (i.e. program compilation) phase. Further, applicant notes that "the execution phase proceeds essentially in reverse order to the configuration phase."
>
> "A person of ordinary skill in the art would readily understand that claims 17-19 refers to the statistical frequency of occurrence of word parts with reference to the preceding instructions in the compilation phase (see e.g., claim 11 "first group of preceding primary instruction words.)"

28. The teachings of paragraphs 13 and 14 of the specification do not enable one of ordinary skill in the art to understand how to make and/or use the limitations from claims 17-19 in the disclosed invention. The teachings also do not make the limitations of claims 17-19 definte, since it is unclear what the limitations mean or refer to in the disclosed invention. Applicant states that claims 17-19 refer to the "statistical frequency of occurrence of word parts with reference to the preceding instructions in the compilation phase", which still fails to clarify what is intended by claims 17-19. It is unclear what the "statistical frequency of occurrence of word parts" means, for instance, it could mean how many word parts are in a program word, how many word parts are in a primary instruction, how many word parts are in the current primary instruction, how many word parts are in the secondary instruction, how many word parts are similar to word parts in a different instruction or program word, etc. The phrase "with reference to the preceding instruction" does not clarify any relationship between the frequency of word parts and the preceding instructions. There is no mention of the word "frequency" found in either paragraph 13 or 14. There is a mentioning of finding the previous primary instruction that is most similar to the current primary instruction in order to minimize the storage requirement for a program word (paragraph 14), however, it is unclear how that relates to the limitations found in claims 17-19. Examiner recommends a rephrasing of the claims to more clearly indicate the exact limitations that are intended to be claimed.

29. Applicant argues the novelty/rejection of claim 11.

"Applicant's invention calls for a configuration (compiler) step/phase in which a first reference group of preceding primary instructions is formed. The group of instructions is used as a reference group to avoid repetition of instruction word parts. The group is dynamically or continually updated in the execution steps/phase by the dynamic storage of the second group of secondary instruction words"

30. These arguments are not found persuasive for the following reasons:

a. To clarify, applicant's attention is directed towards the language used in claim 11. Applicant claims, "the configuration step is configured so that, a program word has a first characteristic of a primary instruction word from a first group of preceding primary instruction words." Also, "obtaining a store of a second group (12) of secondary instruction words corresponding in number to the first group (11)." There is not a claimed step of *forming* "a first reference group of preceding primary instructions." There is no definition provided for the "first group of preceding primary instruction words," in claim 1. Applicant appears to be arguing limitations not found in the claims, including the "forming" of the first group and the dynamic/continued updating of the first group.

31. Applicant argues the novelty/rejection of claim 11.

"Neither Smith nor AAPA describe, teach, or suggest selection of a previous instruction word from the reference group using a criteria of the greatest similarity."

32. These arguments are not found persuasive for the following reasons:

33. To clarify, applicant's attention is directed towards the combined teachings of AAPA and Smith, as in the 35 USC 103 rejection above. AAPA teaches the difference/delta encoding using only one previous instruction (applicant's secondary instruction) combined with the difference encoding of a subsequent

instruction (Applicant's program word). AAPA lacks the ability to combine the compressed instruction data of a subsequent instruction (Applicant's program word) with *one of multiple* previous instructions (Applicant's secondary instructions). However, Smith teaches a difference encoding technique with a dictionary containing *multiple entries* that can be combined with compressed data to form an uncompressed word. Smith also teaches "a simple dynamic programming algorithm to find a minimal length compressed form." This inherently means that the association taught by Smith to associate one entry (of a plurality of entries) in the dictionary with compressed data to form uncompressed words is by using a criterion of the greatest similarity. Smith is teaching this for the same reasons as the Applicant (Specification, page 5, bottom of paragraph 14), it enables the smallest amount of compressed data to be stored. (Smith, page 351, section 4)

34. Applicant argues the novelty/rejection of claim 11.

"Smith's sliding dictionary is unlike applicant's dynamic reference groups of "complete" prior instructions compiled during configuration or updated during program execution (primary or secondary instructions)"

"In contrast, applicant's claim 11 requires the storage of previously generated "complete" VLIW or instruction words (e.g., in the second reference group)"

35. These arguments are not found persuasive for the following reasons:

b. To clarify, applicant's attention is directed towards the language and limitations in claim 11. Throughout claim 11, there is no requirement for "the storage of previously generated 'complete' VLIW or instruction words". Applicant does claim "ascertaining that a particular secondary instruction word..." and "the

program word are combined with the particular secondary instruction word from the second group", however, as the claim 11 is for a method *comprising*, there is no limitation present restricting the claim to only "complete" secondary instructions that are stored and combined with the program words.

c. Examiner also notes that this aspect of Smith was not combined with AAPA in the 35 USC 103 rejection above. AAPA already teaches combining a previous "complete" instruction with subsequent compressed data (which amounts to a difference encoding and is referred to by applicant as a program word). Smith teaches that multiple data entries can be referenced, depending value of the program word's characteristic (pointer), whereas AAPA only teaches *one* previous instruction can be referenced.

36. Applicant argues the novelty/rejection of claim 11.

"Bealkowski relates execution of condensed instructions in a CISC or a RISC processor, which do not involve VLIW instructions"

"Bealkowski does not describe any method for compressing instruction words with multiple parts into program words in a compilation phase, or any method for decompressing the compressed program words in an execution phase."

37. These arguments are not found persuasive for the following reasons:

d. To clarify, applicant's attention is directed towards the 35 USC 103 rejection of claim 11 set forth above. Bealkowski is not used in the rejection and therefore the arguments are moot.

Conclusion

38. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin P Rizzuto whose telephone number is (571) 272-4174. The examiner can normally be reached on M-F, 8-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Chan can be reached on (571) 272-4174. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

KPR

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